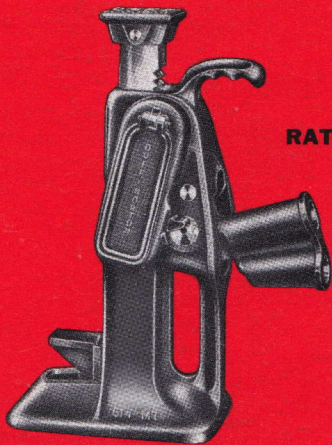


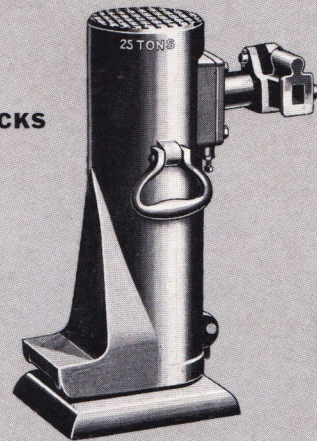
J-1

# DUFF-NORTON

## JACK MANUAL



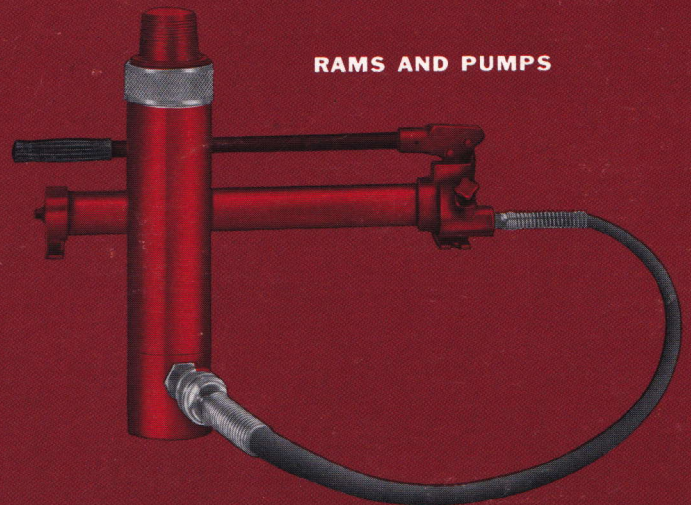
RATCHET JACKS



SCREW JACKS



HYDRAULIC JACKS



RAMS AND PUMPS

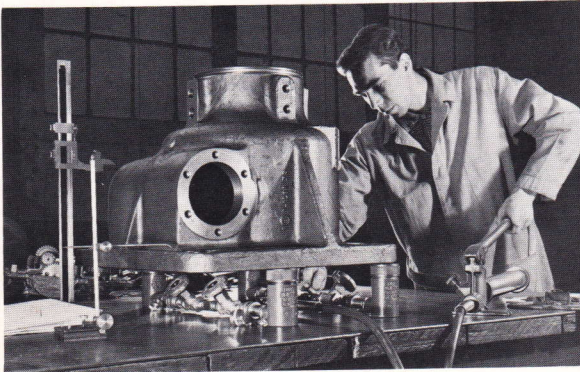




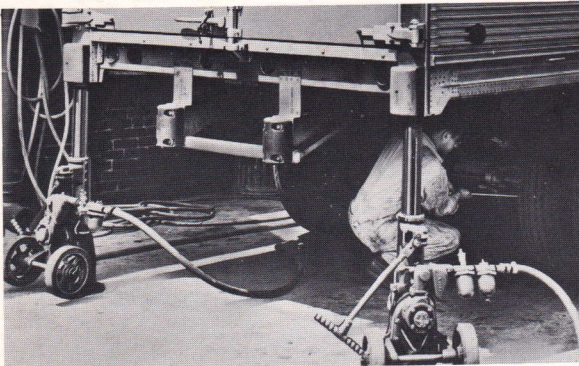
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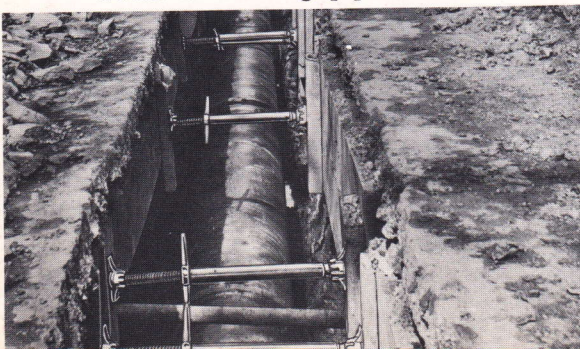
*Four Ram-Pac rams interconnected with one hand pump, to raise heavy casting.*



*Two 20-ton air motor jacks lifting loaded truck trailer to facilitate repairs.*



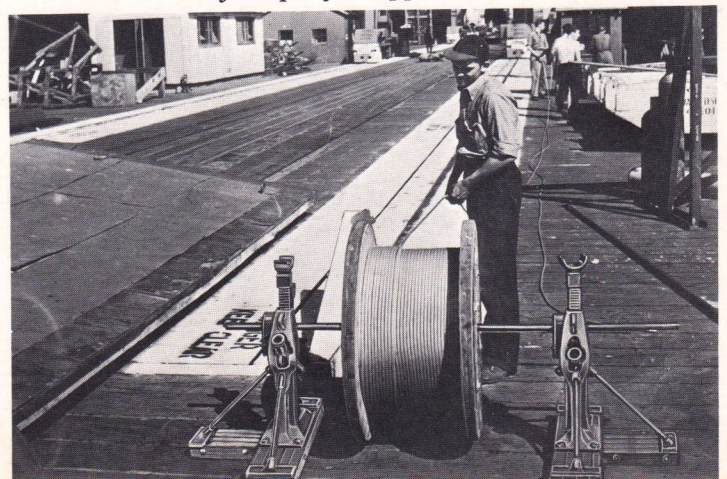
*Steel trench braces as used by contractor to brace large pipeline trench.*



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*Two 10-ton ratchet reel jacks used by utility company to support cable reels.*





## HOW TO SELECT THE CORRECT JACK

**Weight of load**—This is the first consideration. However, the following points also are important:

**Height of jack and "raise"**—See pages 2 and 3. For general use, jack should have fairly high raise, for a variety of applications.

**Speed of lifting and lowering**—Ratchet jacks are fastest but are limited to lighter loads. Screw and hydraulic types are more powerful but slower.

**Type of lowering**—Ratchet jacks are available with either trip or ratchet lowering, or combination of both. Screw

jacks are available in manual or self-lowering models.

**Safety**—Be sure jack selected will handle load safely. Be sure to position jack squarely on a firm lifting surface.

**Weight of jack**—If jack will be moved frequently, select lightest weight of desired capacity. Many models with identical lifting power are available with either malleable iron or aluminum housings.

**Constant service**—For a jack which will be in constant use consider lowering and lifting speed, operating and handling ease, simplicity of maintenance and repair.

nance and repair.

**For close quarters**—Small head jacks are best for narrow spaces because they can be spotted squarely under the load. Where space is plentiful, large head jacks give more load-gripping area.

**Use of foot lift**—Most ratchet and many screw jacks are equipped with foot lifts for getting a good "toe-hold" close to ground.

**Jack cost**—When two or more jacks will fill requirements, price and application should be determining factors. However, quality, maintenance and serviceability also should be considered.

## DEFINITIONS

**Rack**—The notched square bar on ratchet jacks that rises as lever is operated.

**Foot-lift**—Protruding toe or "foot" near base. For lifting low loads.

**Pawls**—Fastened to lever socket and frame, they have teeth which fit into

notches of rack, providing grip that raises, lowers and holds the rack.

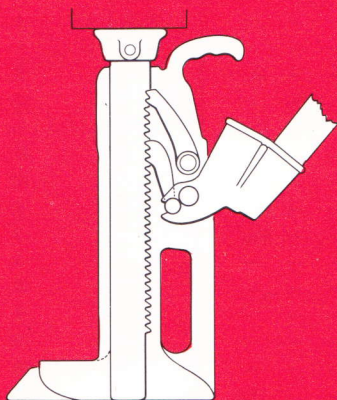
**Single Acting**—Jack is lifted only on downward stroke of lever, lowered only on up-stroke.

**Double Acting**—Jack lifts load on both upward and downward strokes.

**Trip Jack**—For use where necessary to drop the load quickly. Trip jacks cannot be lowered notch by notch.

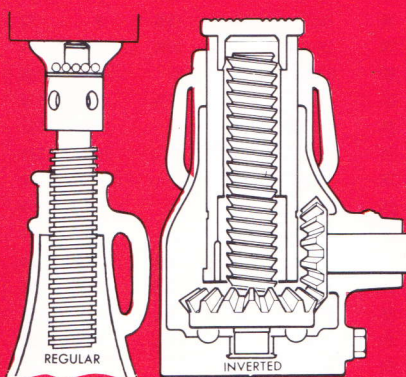
NOTE: Some Duff-Norton jacks are designed for lowering notch by notch when loaded and for tripping, if desired, when unloaded.

## THERE ARE FOUR BASIC TYPES OF JACKS



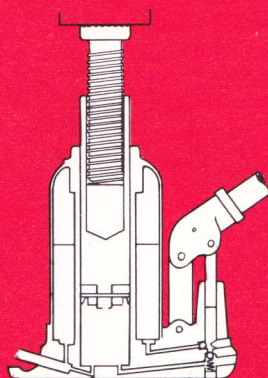
### 1. Ratchet

Simplest construction. Employs the basic lever and fulcrum principle. Downward stroke of the lever raises rack bar one notch at a time and the pawls spring into position, automatically holding the load and releasing the lever for the next lifting stroke. Use should be limited to lighter loads, usually to 20 tons, because of physical effort required. Advantages are less expensive construction, fast operation.



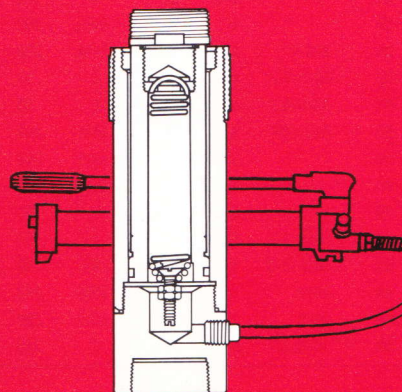
### 2. Screw

For lifting heavier loads, the screw and nut principle is used. Two general types—regular and inverted. For lighter loads a simple lever bar will apply sufficient power to turn screw but as loads increase, gear reductions and ratchet devices are used to multiply the operator's strength. In the heaviest jacks the screw is operated by an air motor for faster lifting and lowering without effort.



### 3. Hydraulic—Integral Pump

Employs the tremendous power of hydraulics to lift heavy loads with little effort. Unit pressure exerted on a small area of incompressible fluid is transmitted undiminished to a larger area in the same closed circuit, thus multiplying the exerted force. Not as fast in operation as ratchet type. Excellent for easy lifting of heavy loads.

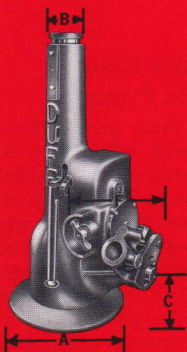
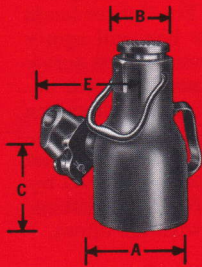


### 4. Hydraulic Ram—Separate Pump

Operates on same principle as hydraulic jacks, but pump is in separate unit so that workman can operate the pump at a safe distance from the load. Rams provide maximum amount of travel for a given closed height. Various pumps may be used—powered by hand, electric motor, air motor or gasoline engine.



# JACK SELECTION CHART



SPECIFICATIONS								DIMENSIONS						PAGE REFERENCE BY JACK NUMBER	
Capacity Tons	Jack No.	Type of Jack*	Closed Height Inches	Raise Inches	Weight Pounds	Price† (see footnote)	Page No.	A	B	C	D	E	F		
3	3-H-9	H	8½	9½	13	\$ 19.00	6	3¾x6¾	1½	—	—	—	—	1-A	9
5	514-MT	R	14	7½	31	35.00	7	5¼x7¾	2½x2¾	—	2½	1½	—	1½x8	13
5	516-MT	R	16	9½	34	38.00	7	5¼x7¾	2½x2¾	—	2½	1½	—	1½x10	13
5	521-MT	R	21	14½	41	43.00	7	5¼x7¾	2½x2¾	—	2½	1½	—	1½x12	13
5	5-H-9	H	9	10¼	17	23.00	6	4¾x7½	1½	—	—	—	—	1¾x10	13
8	8-H-9	H	9	10½	22	28.00	6	4¾x7½	1½	—	—	—	—	1¾x12	13
10	1017	R	17¼	9	55	49.00	7	7x10	3x3	—	2½	2¼	—	2x8	13
10	1020	R	20	11½	59	61.00	7	7x10	3x3	—	2½	2¼	—	2x10	13
10	1022	R	22	12	65	61.00	7	7x10	3x3	—	2½	2¼	—	2x12	13
10	T-11	S	8	7	37	81.00	13	7½	3½	—	—	—	—	3-H-9	6
12	1½x8	S	10¾	5	14	9.00	13	6	3¾	—	—	—	—	5-H-9	6
12	1½x10	S	12¾	8	15	11.00	13	6½	3¾	—	—	—	—	8-H-9	6
12	1½x12	S	14¾	9	19	12.00	13	6½	3¾	—	—	—	—	12-H-9	6
12	12-H-9	H	9¼	8¾	28	36.00	6	4¾x8¾	1¼	—	—	—	—	MR-8	15
15	1522	R	22	11½	82	82.00	7	8x11	3x3½	—	2½	2½	—	RC-10-H-4.5	4
15	1523	R	23	12½	70	107.00	8	7½x10¾	2¾x4	—	2½	2¼	—	RC-10-H-11.7	4
15	1528	R	28	17½	96	84.00	7	8x11	3x3½	—	2½	2½	—	T-11	13
15	1-A	R-T	22	13	60	52.00	9	6½x11	3x3	—	2½	2	—	12-H-9	6
15	110	R-T	22	13	62	59.00	9	6½x11	3x3	—	2½	2	—	T-14	13
15	117	R-T	22	12	66	53.00	9	6½x11	3x3	—	2½	2	—	MR-16	15
15	117-A	R-T	22	12	46	67.00	9	6½x11	3x3	—	2½	2	—	RC-20-H-11.2	4
15	217	R-T	16½	7½	52	47.00	9	6½x11	3x3	—	2½	2	—	20-H-11-S	6
15	517-B	R-T	11½	5	47	47.00	9	6½x10¼	—	—	2½	2	—	25-H-7.5	6
15	517-BA	R-T	11½	5	31	58.00	9	6½x10¼	—	—	2½	2	—	25-H-8.7	6
15	617	R-T	28	18½	81	66.00	9	7x12	3x3	—	2½	2	—	25-H-9.3	6
15	717-BA	R-T	14	7½	36	58.00	9	6½x10¼	—	—	—	2	—	29-A	8
15	S	S	21¾	11½	73	122.00	11	8½ dia.	4¾	4½	3¾	3¾	6	30-H-11	6
15	1507	S	7	2½	22	69.00	10	4¾	2¾	3¾	—	—	5¾	RC-30-H-4.5-2	4
15	111-C-2	S	10	5	26	79.00	10	4¾	2¾	3¾	—	—	5¾	RC-30-H-10	4
16	1¾x10	S	13½	7½	21½	13.00	13	6¾	3¾	—	—	—	—	35-H-7.7	6
20	2028	R	28	18	103	93.00	7	8x11	3x3½	—	2½	2½	—	35-H-9.7	6
20	T-14	S	16	18	75	123.00	13	8¾	3½	—	—	—	—	40-TB-15	13
20	2x8	S	11¾	5	21	13.00	13	6¾	3¾	—	—	—	—	40-TB-26	13
20	2x10	S	13¾	7	25	15.00	13	6¾	3¾	—	—	—	—	41-TB-20	13
20	2x12	S	15¾	9	33	16.00	13	7¾	3¾	—	—	—	—	RC-50-H-4.7	4
20	20-H-11-S	H	10¾	7¾	40	58.00	6	5½x7	2¼	—	—	—	—	RC-50-H-11	4
20	228-R	A	28	18	238	688.00	16	12	4	—	—	—	14	50-H-12	6
25	29-A	R	27¾	15¼	170	293.00	8	7	4x4	—	3	2¼	—	MR-80	15
25	B-2522	S	22	10¼	137	251.00	11	8x9¾	5¾	4¾	3	3¾	7½/16	RC-100-H-11	4
25	2825	S-S	28	15¾	175	450.00	11	12	4	5½	—	—	10½	100-A-12	10
25	2509-C-2	S	9	4½	37	97.00	10	5¾	3	3½	—	—	6¾/16	100-C-12	10
25	2510-C-2	S	10	5	38	97.00	10	5¾	3	3½	—	—	6¾/16	100-H-12	6
25	2510-A-2	S	10	5	29	104.00	10	5¾	3	3½	—	—	6¾/16	102-OW	9
25	825-L	S	12¼	4½	28	52.00	13	6¾	3¾	—	—	—	—	110	9
25	25-H-7.5	H	7½	4	35	110.00	6	5x7	2½	—	—	—	—	111-C-2	10
25	25-H-8.7	H	8¾	4	36	139.00	6	5x7	—	—	—	—	—	117	9
25	25-H-9.3	H	9¾	6	38	114.00	6	5x7	2½	—	—	—	—	117-A	9
30	30-H-11	H	11	7	66	113.00	6	6x8½	3	—	—	—	—	126-RX	16
35	2835	S-S	28	15¾	175	517.00	11	12	4	5½	—	—	10½	144-RX	16
35	3510-A-2	S	10	5	35	134.00	10	5¾	3¾	3¾	—	—	6½/16	MR-160	15
35	3510-C-2	S	10	5	48	125.00	10	5¾	3¾	3¾	—	—	6½/16	217	9
35	3265-BB	S-S	26	14	178	517.00	12	12	6¼	4½	3	4	7	228-R	16
35	B-3526	S	26	14¼	207	368.00	11	9x10½	6½	—	—	3½	—	326-R	16
35	326-R	A	26	14¾	258	909.00	16	14	4	—	—	—	14	500	8
35	35-H-7.7	H	7¾	4	51	148.00	6	6x8	2¾	—	—	—	—	514-MT	7
35	35-H-9.7	H	9.7	6	55	148.00	6	6x8	2¾	—	—	—	—	516-MT	7
50	5261-BB	S-S	26	14½	269	636.00	12	13¾	6	—	—	—	11½	517-B	9
50	5265-BB	S-S	26	14½	292	666.00	12	14	10	6	5	4½	11½	517-BA	9
50	B-5024	S	24	10½	289	429.00	11	14	10¼	5½/16	4¾	5¼	11¾	520-CR	14
50	5017	S-C	16½	7	191	367.00	10	14	5½	4	2¼	5	9¾	521-MT	7
50	5010-C-2	S	10	4½	64	206.00	10	7¾	4	3¾	—	—	8¾	524	13
50	5010-A-2	S	10	4½	50	206.00	10	7¾/16	4	3¾	—	—	8¾	524-MCR	8
50	2850	S-S	28	15½	240	666.00	11	14	5½	5½	—	—	11½	528-RX	16
50	2650	S-S	26	13½	238	636.00	11	14	5½	5½	—	—	11½	528-AE	17
50	50-H-12	H	12	7	123	178.00	6	7½x10	3¾	—	—	—	—		



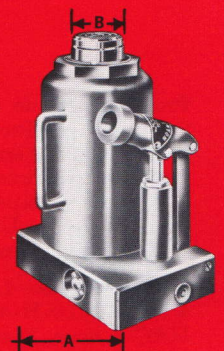
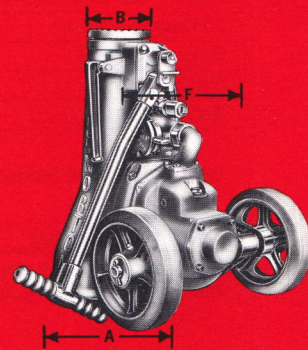
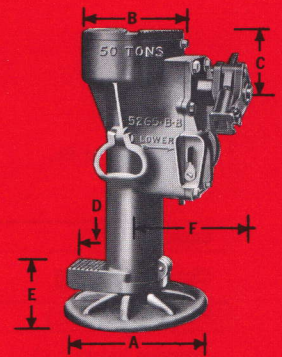
\*Symbols for Types of Jacks:  
R—Ratchet  
R-T—Ratchets, Trip-Lowering

S—Screw  
S-S—Screw, Self-Lowering  
S-C—Screw, Detachable Claw  
H—Hydraulic  
H-I—Hydraulic, Independent Pump  
A—Screw, Air Motor  
E—Electric Drill Powered

Red figures indicate jacks  
with foot lift.

		SPECIFICATIONS								DIMENSIONS						
PAGE REFERENCE BY JACK NUMBER		Capacity Tons	Jack No.	Type of Jack*	Closed Height Inches	Raise Inches	Weight Pounds	Price† (see footnote)	Page No.	A	B	C	D	E	F	
		50	528-RX	A	28	17	370	\$1250.00	16	14	5	—	—	—	18	
		50	528-AE	E	28	17	335	624.00	17	14	5	—	—	—	—	
		50	536-RX	A	36	25	425	1302.00	16	15	5	—	—	—	18	
		100	100-A-12	S	12	4	100	420.00	10	8¾	5	3¾	—	—	7⅞ <sub>16</sub>	
		100	100-C-12	S	12	4	145	420.00	10	8¾	5	3¾	—	—	—	
		100	100-H-12	H	12	6½	225	355.00	11	9½x12	5	—	—	—	—	
	530-CR	14	100	1265-BB	S-S	26	12	412	1014.00	12	13¾	10	11¼	4½	4½	11¼
	571-MA	12	100	1263-C	S-S	26	13½	402	984.00	12	14	7½	10	—	—	13
	536-RX	16	100	126-RX	A	26	14	448	1381.00	16	13	6½	—	—	—	18
	617	9	100	144-RX	A	44	30	530	1607.00	16	18	6½	—	—	—	18
717-BB	9															
810	11	CABLE REEL JACKS														
S-825	13	5	524-MCR	R	21	14	68	61.00	8	9x19	—	—	—	—	—	
825-L	13	5	520-CR	S	20	11½	66	41.00	14	12½x26½	—	—	—	—	—	
1001	14	5	530-CR	S	30	16½	90	54.00	14	15½x38½	—	—	—	—	—	
1002	14	10	1022-CR	R	38	12	103	104.00	8	9¾x24	—	—	—	—	—	
1003	14	10	1030-CR	R	30	14	112	118.00	8	—	—	—	—	—	—	
1004	14															
1005	14	POLE JACK														
1006	14	15	500	R	37½	23	230	139.00	8	10x24	—	—	—	—	—	
1007	14															
1008	14	RAM-PAC RAMS														
1009	14	Capacity Tons	RAM Number	Type	Closed Height Inches	Raise Inches	Weight Pounds	Price† (see footnote)	Page No.	A	B	C	D	E	F	
1010	14	10	RC-10-H-4.5	H-I	4½	2⅞	5¼	34.00	4	2⅞ dia.	1½	—	—	—	—	
1011	14	10	RC-10-H-11.7	H-I	11⅞ <sub>16</sub>	6⅞ <sub>16</sub>	11¾	38.00	4	2⅞ dia.	1½	—	—	—	—	
1012	14	20	RC-20-H-11.2	H-I	11¼	5⅞	21¾	81.00	4	3⅞ dia.	2⅞ <sub>16</sub>	—	—	—	—	
1013	14	30	RC-30-H-4.5-2	H-I	4½	2⅞ <sub>16</sub>	13½	40.00	4	3⅞ dia.	2½	—	—	—	—	
1014	14	30	RC-30-H-10	H-I	10	6	27	70.00	4	4 dia.	2⅞	—	—	—	—	
1015	14	50	RC-50-H-4.7	H-I	4¾	2⅞	25	51.00	4	5 dia.	3½	—	—	—	—	
1016	14	50	RC-50-H-11	H-I	11	6⅞	49¾	132.00	4	5 dia.	3½	—	—	—	—	
1017	7	100	RC-100-H-5.7	H-I	5¾	2	54	115.00	4	4⅞ <sub>16</sub> dia.	7	—	—	—	—	
1018	7	100	RC-100-H-11	H-I	11	5	95	259.00	4	7 dia.	4⅞ <sub>16</sub>	—	—	—	—	
1019	7															
1020	7	TRAVERSING JACKS														
1021	7	Ca- pacity Tons	Jack No.	Type of Jack*	Horizontal Travel Inches	Closed Height Inches	Raise Inches	Weight Pounds	Price† (see footnote)	Page No.	A	B	C	D	E	F
1022	7	35	S-825	S	12	24	10½	139	194.00	13	9¾x23	3½	—	—	—	—
1023	8	50	524	S	20	28	10½	435	600.00	13	14 dia.	10¼	9⅞ <sub>16</sub>	4¾	9¾	11¾
1024	7															
1025	7	TRAVERSING BASES														
1026	7	Ca- pacity Tons	Jack No.	Type of Jack*	Height Inches	Horizontal Travel Inches	Weight Pounds	Size of Plate Inches	Price† (see footnote)	Page No.	A	B	C	D	E	F
1027	7	50	40-TB-15	S	4	15	110	10x12	155.00	13	—	—	—	—	—	—
1028	7	50	40-TB-26	S	4¾	26	134	10x12	231.00	13	—	—	—	—	—	—
1029	7	100	41-TB-20	S	4	20	136	14 dia.	172.00	13	—	—	—	—	—	—
1030	7															
1031	7	PUSH & PULL JACKS														
1032	7	Capacity Tons	Jack No.	Type of Jack*	Screw Diameter Inches	PUSHING		PULLING		Weight Pounds	Price† (see footnote)	Page No.				
1033	7					Closed Inches	Extended Inches	Closed Inches	Extended Inches							
1034	7	10	1024	S	2	7¾	21½	5¾	19½	46	55.00	14				
1035	7	10	1029	S	2	7¾	25½	5¾	23½	50	58.00	14				
1036	7	15	1538	S	2½	7½	34	7½	34	97	98.00	14				
1037	7	RAM-PAC PUMPS, UNITS, ATTACHMENTS.....													4-5	
1038	7	MINE ROOF JACKS.....													15	
1039	7	OIL WELL CIRCLE JACKS.....													9	
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1041	7	BUGGY.....													11	
1042	7	MOTOR ATTACHMENT.....													12	

†The prices shown are approximate only and are listed for your convenience in making comparisons between models of same capacity.





## RAM-PAC RAMS

Each of these nine Duff-Norton Rams provides more travel for a given closed height than other rams now available. They also have fewer parts, for minimum maintenance. See complete specifications below.

\*Constructed with aluminum block and housing, for easy portability.

## RAM-PAC PUMPS

Hand Pumps—HP-40 and HP-50 (single speed) and HP-150 (two speed) require little effort and few strokes because of long plunger stroke per inch of rise. Power Pumps—HAP-250 is actuated by air pressure of 85 to 110

psi requiring only 15 cu. ft. of air per minute at rated capacity. HEP-250 and HEL-250\* are operated by 1 HP, 115-230 volt electric motor. HGP-250 and HGL-250\* are operated by 1.7 HP gasoline engine and thus are ideal for field work.

### RAM-PAC RAM SPECIFICATIONS

Ram Model No.	RC-10-H-4.5*	RC-10-H-11.7	RC-20-H-11.2	RC-30-H-4.5-2	RC-30-H-10	RC-50-H-4.7	RC-50-H-11-B	RC-100-H-5.7	RC-100-H-11-B
Capacity (Tons)	10	10	20	30	30	50	50	100	100
Closed Height (In.)	4½ 5⅓⅓*	11⅓⅓	11¼	4½	10	4¾	11	5¾	11
Plunger Travel (In.)	2⅞	6⅓⅓	5⅞	2⅞⅓	6	2⅞	6⅞	2	5
Extended Height (In.)	7⅞ 8⅓⅓*	17⅞	16⅞	6⅓⅓⅓	16	6⅞	17⅞	7¾	16
Base Size (In.)	2⅞ Dia.	2¼ Dia.	3⅞ Dia.	3⅞ Dia.	4 Dia.	5 Dia.	5 Dia.	7 Dia.	7 Dia.
Plunger or Cover Shell Dia. (In.)	1½	1½	2⅞⅓	2⅞	2⅞	3½	3½	4⅓⅓	4⅓⅓
Type of Plunger Retraction	Manual	Spring	Spring	Manual	Spring	Manual	Spring	Manual	Spring
Base Thread (Female)	None	1¼ NPT	2 NPT	None	None	None	None	None	None
Collar Thread (Male)	2¼-14	2¼-14	3⅞-12	None	None	None	None	None	None
Plunger Thread	1¼ NPT	1¼ NPT	2 NPT	None	None	None	None	None	None
Effective Ram Area (Sq. In.)	2.074	2.074	4.43	6.492	6.492	11.045	11.045	20.63	20.63
Oil Capacity (Cu. In.)	7.22	16.25	39.25	16.25	53.25	24.4	92.77	43	144.4
Oil Capacity (Oz.)	4	9	17	9	29.5	13.5	51.4	23.7	80
Weight (Lbs.)	5¼	11⅞	21¾	13½	27	25	49¾	54	95
Working Pressure (PSI)	9650	9650	9050	9250	9250	9055	9055	9695	9695
Recommended with Pumps	All Models	All Models	All Models	All Models	All Except HP-50	All Models	All Except HP-50	All Models	All Except HP-50
Pipe Thread Connection	¾	¾	¾	¾	¾	¾	¾	¾	¾

NOTE: All rams above preceded with RC have ram-half coupling HA-18 attached for quick connecting to hose coupling half HA-17. If ram is desired without coupling omit C when ordering. For example R-10-H-4.5 indicates ram only. \*Includes adapter head.



RC-50-H-4.7



RC-100-H-5.7



RC-50-H-11



RC-100-H-11



RC-10-H-4.5



RC-10-H-11.7



RC-20-H-11.2



RC-30-H-4.5-2



RC-30-H-10

## COMPLETE RAM-PAC UNITS

Provide portable, remote-controlled power for many production, maintenance and testing applications. Rams are easily positioned in restricted spaces, with operator actuating pumps from a safe distance. Each Ram-Pac Unit includes ram, pump, six feet of high-pressure hose and couplings.

**PR-10-H-4.5**—Low height, 10-ton unit with RC-10-H-4.5 ram, HP-50 pump, HAC-3 hose. Standard adapter head increases closed height from 4½" to 5⅓⅓". Plunger retraction—manual.

**PR-10-H-11.7**—Ten-ton unit with RC-10-H-11.7 ram, HP-50 pump, HAC-3 hose. Plunger is retracted by spring action.

**PR-20-H-11.2**—Twenty-ton unit with RC-20-H-11.2 ram, HP-50 pump, HAC-3 hose. Plunger is retracted by spring action.

**PR-30-H-4.5-2**—Low height, 30-ton unit with RC-30-H-4.5-2 ram, HP-50 pump, HAC-3 hose. Plunger retraction—manual.

**PR-30-H-10**—Thirty-ton unit with RC-30-H-10 ram, HP-150 pump and HAC-3 hose. Plunger is retracted by spring action.

**PR-50-H-4.7**—Low height, 50-ton unit with RC-50-H-4.7 ram, HP-50 pump, HAC-3 hose. Plunger retraction—manual.

**PR-50-H-11**—Fifty-ton unit with RC-50-H-11-B ram, HP-150 pump and HAC-3 hose. Plunger is retracted by spring action.

## ACCESSORIES & FITTINGS

HA-2—Close Nipple, hex body, ¾" male thread.  
HA-3—Pipe Tee, ¾" female thread outlets.  
HA-4—Shut-Off Valve, ¾" female thread.  
HA-12-1—Gage, measures 0 to 10, 20, 30 tons and 10,000 psig.  
HA-12-2—Gage, same as above, with maximum reading indicator.  
HA-13-1—Gage, measures 0 to 50, 100 tons and 10,000 psig.  
HA-13-2—Gage, same as above, with maximum reading indicator.  
HA-14—Maximum Reading Indicator.  
HA-15—Gage Fitting.  
HA-16—Gage Adapter, for hose or pump connection.  
HA-17—Quick Connect Coupling, hose half.  
HA-18—Quick Connect Coupling, ram half.  
HAC-2—Quick Connect Coupling, complete.  
HAC-3—Hose (6') with HA-17 coupling one end and ¾" male pipe fitting other end.  
HA-19—Hose (6') with two ¾" male pipe fittings.  
HA-20—Fitting for attaching additional hose.



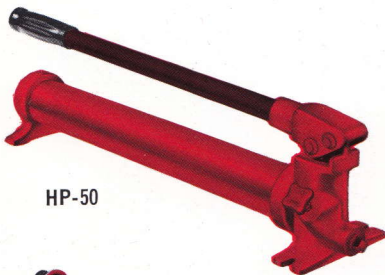
# RAM-PAC PUMP SPECIFICATIONS

Pump Model No.	Oil Cap (Cu. In.)	Max. Working Pressure (PSI)	Pump Plunger Area (Sq. In.)	Pump Plunger Dia. (In.)	Pump Plunger Stroke (In.)	Pump Plunger Displacement (Cu. In.)	*Pump Delivery Cu. In./ (Min.)	Effort Required (Lbs.)	Low Speed By-pass Pressure (PSI)	Hi Speed By-pass Pressure (PSI)	Pipe Thread Conn. (In.)	Handle Length (In.)	Length (In.)	Width (In.)	Height (In.)	Weight (Lbs.)
HP-40	40	10,000	.196	½	1	.196	4.0	110	....	....	¾	14	18	5½	5½	10½
HP-50	50	10,000	.196	½	1	.196	4.0	110	....	....	¾	20	24	5½	5½	12½
HP-150	150	10,000	s—.196 l—.785	s—½ l—1	1	s—.196 l—.785	S-4.0 l-16.0	110	10,000 max. adjustable	500 max. adjustable	¾	20	25	7	7	28

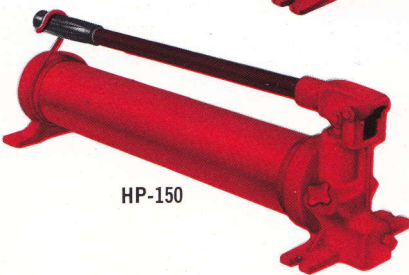
\*Based on 20 strokes per minute.



HGP-250



HP-50



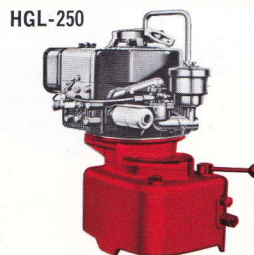
HP-150

Pump Model No.	HAP-250*	HEP-250	HGP-250	HEL-250	HGL-250
Oil Reservoir Capacity Cubic Inches Ounces	346.5 192	346.5 192	346.5 192	346.5 192	346.5 192
Usable Oil Capacity	144 Oz. 260 (Cu. In.)	144 Oz. 260 (Cu. In.)	144 Oz. 260 (Cu. In.)	144 Oz. 260 (Cu. In.)	144 Oz. 260 (Cu. In.)
Constant Working Pressure (PSI)	10,000	10,000	10,000	6,000	6,000
Pipe Thread Connection (In.)	¾	¾	¾	¾	¾
Control Valve	Two-Way	Two-Way	Two-Way	Two-Way	Two-Way
Net Weight (Lbs.)	90*	100	91	64	64
Pumping Capacity (Cu. In. per Min.) 100 PSI 10,000 PSI	200* 50†	150 30	150 45	170 30	170 30
Dimensions Height (In.) Base Size (In.)	15¼* 10½ Dia.	18¾ 10½ Dia.	19 10½ Dia.	19½ 10x12	19 10x12
Floor Space (In.)	16x12¼*	16x12¼	19½x13½	11½x13½	15¾x16

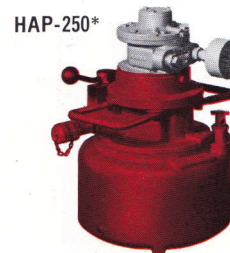
\*At 90 PSIG Air Pressure—105 SCFM †At 90 PSIG Air Pressure— 95 SCFM



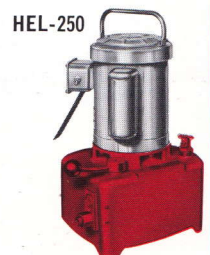
HEP-250



HGL-250



HAP-250\*



HEL-250

Use only Duff-Norton Hydraulic Oil with RAM-PAC Pumps and Rams. Available in quart and gallon containers.

Gages, fittings, couplings and hose also available—see Catalog AD-90.

# RAM-PAC ATTACHMENT UNITS FOR TEN-TON RAMS



**HAC-4—Spreader Unit.** Will spread from 1¼" clearance up to 7¼" for the tall 10-ton ram and to 4½" for the short 10-ton ram without extension tube. Maximum spread limited by tube bending under load.



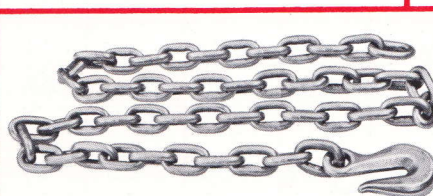
**HAC-5—Toe Lift Unit.** Has minimum clearance of 1¼" maximum lift for tall 10-ton ram and 2⅞" for the short 10-ton ram without extension tube.



**HAC-6-5—Extension Unit.** Last dash number indicates length of extension tube in inches. For longer tubes, change dash number to 10, 20 or 30. (5" unit shown.)



**HAC-8—Jack Base Unit.** Increases stability of ram. Extends closed height by 2¼".



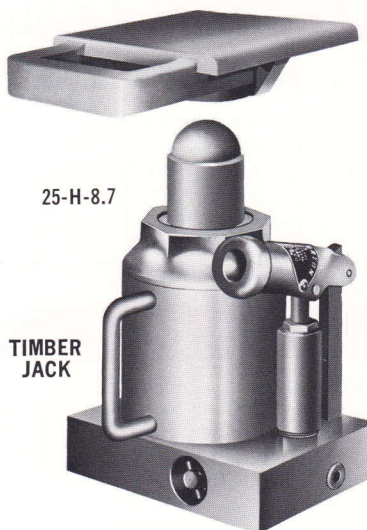
**HAC-7—Pull Chain Unit.** Chain pull plate with 6' of ⅝" heavy-duty steel chain.



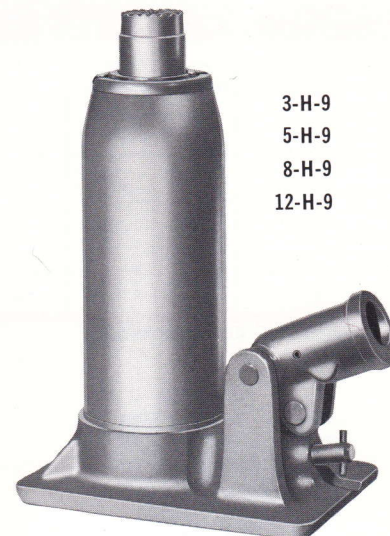
**Unsurpassed dependability  
Calibrated to show weight of load**

Here are some features that make Duff-Norton Hydraulic Jacks the finest obtainable: All 3 to 12-ton models have extension screws which can quickly be run up to load height. Lifting starts with first stroke of lever bar. Both 25 and 35-ton models have patented automatic air vents to eliminate "air lock." They weigh 25% less than other makes of equal capacities. Every model is factory-tested *twice* for capacity and raise.

*NOTE: For best results, use Duff-Norton Hydraulic Oil. Its special rust-inhibiting ingredient protects against corrosion and atmospheric condensation, also protects cup leathers. Available in quarts and gallons. CAUTION—do not use brake or shock absorber fluids.*



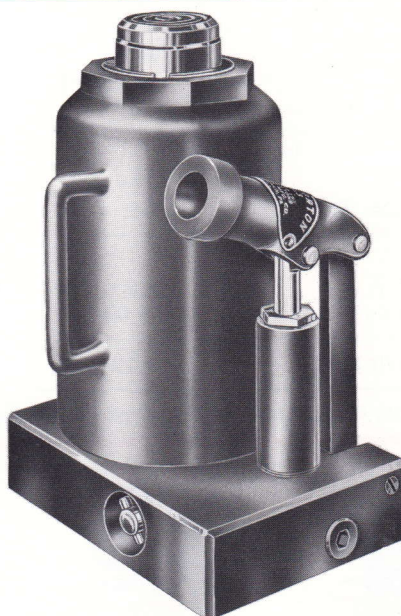
**TIMBER JACK**



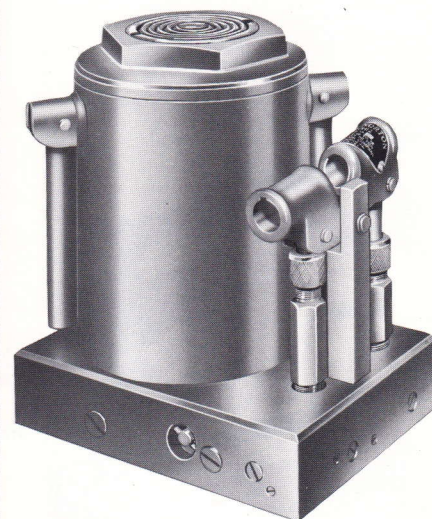
3-H-9  
5-H-9  
8-H-9  
12-H-9



20-H-11-S



25-H-7.5    25-H-9.3    35-H-7.7    35-H-9.7

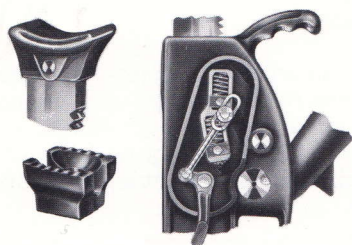


30-H-11    50-H-12    100-H-12

Jack No.	3-H-9	5-H-9	8-H-9	12-H-9	20-H-11-S	25-H-7.5	25-H-8.7	25-H-9.3	30-H-11	35-H-7.7	35-H-9.7	50-H-12	100-H-12
Capacity, Tons	3	5	8	12	20	25	25	25	30	35	35	50	100
Closed Height, Inches	8½	9	9	9¼	10⅞	7½	8¾	9⅞	11	7¾	9¾	12	12
Power Raise, Inches	6	6¼	6¼	5½	7½	4	4	6	7	4	6	7	6⅞
Extension Screw, Inches	3½	4	4¼	3¼	None	None	None	None	None	None	None	None	None
Total Height, Inches	18	19¼	19½	18	18¼	11½	12¾	15⅜	18	11¾	15¾	19	18⅞
Head Dia., Inches	1⅞	1⅞	1½	1⅞	2¼	2¼	...	2⅞	3	2⅞	2⅞	3¾	5
Base Size, Inches	3¼x6¼	4⅞x7⅞	4⅞x7⅞	4¾x8½	5½x7⅞	5x7	5x7	5x7	6x8½	6x8	6x8	7½x10	9½x12
Handle Length, Inches	33½	33½	33½	23½	23½	23½	27½	23½	20	23½	23½	20	20
Weight, Pounds	13	17	22	28	40	35	36	38	66	51	57	123	225
Cylinder Dia., Inches	1⅜	1⅞	1⅞	1⅜	2⅞	2½	2½	2½	2⅞	3	3	3⅞	5



## Outstanding Features

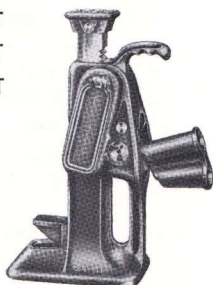


Exclusive, patented spring mechanism is a one-piece, self-contained unit. It can be adjusted, repaired or replaced easily, without dismantling jack. Load is raised or lowered one notch at a time—down stroke for raising and up stroke for lowering. Jacks cannot be tripped when under load.

Rack bars are larger and stronger than in ordinary jacks—can be pulled up by hand to meet the load.

Hinged covers are recessed in housing, to protect lifting mechanisms. Fulcrum centers are located for utmost speed and ease of lifting.

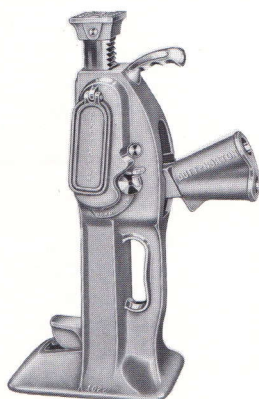
514-MT  
516-MT  
521-MT



**5 TONS**—Single acting, ratchet lowering with foot lift. Furnished with double round sockets and steel operating lever 1" x 30". When jack is not under load, head can be dropped or tripped instantly.

**USES**—For moving, lifting and bracing lighter loads of all kinds. Because rack bar can be dropped after load is removed—a time-saving feature—this jack is popular for rerailling mine cars and locomotives.

1017  
1020  
1022



**10 TONS**—Single acting, ratchet lowering, with foot lift. Furnished with either of these sockets and operating levers: double round or small single round and steel lever 1¼" x 60"; large round and wooden lever 2⅞" x 48"; or square socket to fit your own lining bar.

**USES**—For moving and repairing all types of machinery, road building equipment, streetcar trucks, bolsters and couplings on freight cars; and for erecting drilling rigs, beams, concrete forms, shoring. Model 1020 is standard for street railway cars; Model 1017 is popular for mine cars and locomotives.

1522  
1528  
2028



**15 TONS**—Single acting, ratchet lowering, with foot lift. Double round socket and steel lever bar are standard. Also furnished with large round socket and wood lever 2⅞" x 48"; or with square socket to fit your own lining bars.

**USES**—For industrial plants, mills, mines, contractors, railroads, riggers, truckers, public utilities, machine shops. A heavy-duty all-purpose jack for lifting, lowering, molding and moving all kinds of loads.

**20 TONS**—Single acting, ratchet lowering with foot lift, double round sockets and steel lever 1¼" x 60". Also available with small single round socket; large round socket with wooden lever 3⅞" x 66"; or square socket for your lining bars.

**USES**—The heaviest, strongest, most powerful Duff-Norton ratchet lowering jack. Ideal for the most difficult lifting, holding, moving and lowering jobs in mills, mines, railroads, public utilities plants and contractor operations.

Every Duff-Norton Ratchet Jack is guaranteed at full capacity for load applied to either head or foot lift. Curved tops available for all Duff-Norton Ratchet Jacks.

Slotted head for use with chain as a sling available with 516MT. 3½ feet of ⅞" chain supplied at extra cost.

Jack No.	514-MT	516-MT	521-MT	1017	1020	1022	1522	1528	2028
Capacity, Tons	5	5	5	10	10	10	15	15	20
Height, Inches	14	16	21	17¼	20	22	22	28	28
Raise, Inches	7½	9½	14½	9	10½	12½	11½	17½	18
Base, Inches	5¼x7¾	5¼x7¾	5¼x7¾	7x10¼	7x10¼	7x10¼	8x11	8x11	8x11
Head, Inches	2½x2¾	2½x2¾	2½x2¾	3x3	3x3	3x3	3x3½	3x3½	3x3½
Foot Lift Ht., Inches	1½	1½	1½	2¼	2¼	2¼	2½	2½	2½
Weight, Pounds	31	34	41	55	59	65	82	96	103
Rack Size	1¼x1½	1¼x1½	1¼x1½	1⅝x1⅝	1⅝x1⅝	1⅝x1⅝	1¾x2¼	1¾x2¼	1¾x2¼



29-A

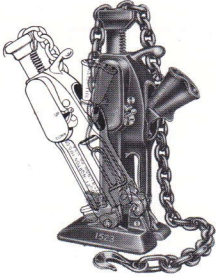


### Geared ratchet lowering jack

**25 TONS**—Single-acting, geared ratchet lowering jack with foot lift. Furnished with round, wooden operating lever  $3\frac{1}{16}$ " x 66" long. Because leverage is compounded by gears, heavy loads can be lifted quickly and easily.

**USES**—A favorite with riggers, oil drillers, heavy construction, forge and foundry shops and railroad repair shops. Also widely used for machinery repair, and by street railways for removing crossovers embedded in concrete.

1523



### 4-way ratchet lowering jack

**15 TONS**—Single-acting, double round socket, ratchet lowering jack with slotted head, chain sling, claw, swivel base and foot lift. Furnished with steel combination operating lever and pinched end pry bar  $1\frac{1}{4}$ " x 60". Also with 5 feet of  $\frac{1}{2}$ " BBB chain, with grab hook and pear-shape ring.

**USES**—For head, chain, claw and foot lifting. Swivel base increases versatility. Operates at full capacity at any angle. Claw increases support and protects against load shifting. Called "Roustabout" by oil drillers, it is used for rigging, tightening belts, lifting and lowering pipe and pole pulling.

500



### Pole pulling jack

**15 TONS**—Single-acting, ratchet lowering jack with chain attachment, hinged channel base, double round socket. Furnished with solid steel combination operating lever and pinched end pry bar  $1\frac{1}{4}$ " x 66" long, and 8 feet of  $\frac{3}{4}$ " BBB chain.

**USES**—For power, light, railroad, street railway, telephone and telegraph companies to pull, move or straighten poles without interrupting service. Hinged channel base permits jack to be operated at any angle on level ground, or upright on hillsides.

524- MCR

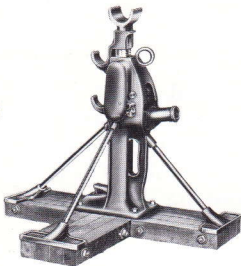


### Ratchet reel jack with adjustable hook

**5 TONS**—Single-acting, ratchet lowering jack with adjustable hook, reinforced oak base, double round socket. Furnished with solid steel combination operating lever and pinched end pry bar 1" x 30" long.

**USES**—Holds reels 15 to 60 inches in diameter. To save time, adjustable hook is raised by hand to meet spindle. Will seat 2-inch spindles. Standard for phone and cable companies. Adapted to shop and warehouse use for handling reels of all kinds.

1030- CR



### Ratchet reel jack with "T" frame base

**10 TONS**—Single-acting, ratchet lowering jack with top and double side hooks, furnished in pairs—left and right hand. Furnished with single round socket and solid steel combination operating lever and pinched end pry bar  $1\frac{1}{4}$ " x 60" long.

**USES**—Used in pairs for reels 20 to 84 inches. Standard with utility companies. Swivel joint of head hook allows easy spotting without binding spindle. Rack bar hand-adjustable to meet load. Right and left hand models allow operators to work together. Top hook holds 3", lower hooks  $2\frac{1}{2}$ " spindles.

1022- CR



### Ratchet reel jack with multiple hooks

**10 TONS**—Single-acting, ratchet lowering jack with top and triple side hooks. Furnished with single round sockets and solid steel combination operating lever and pry bar  $1\frac{1}{4}$ " x 60" long.

**USES**—Used in pairs for reels 25 to 90 inches in diameter on level ground in plants, warehouses, shipyards and public utilities. Rack is extra long. Hooks are located 12,  $22\frac{1}{2}$ , 33 and 38 inches from ground and can handle spindles up to 2 inches in diameter. Solid oak base.

See 5 Ton Screw Type Reel Jacks on page 13

Jack No.	29-A
Capacity, Tons	25
Height, Inches	27 $\frac{3}{4}$
Raise, Inches	15 $\frac{1}{4}$
Base, Inches	12
Head, Inches	$3\frac{1}{2}$ x3 $\frac{3}{4}$
Foot Lift Height, In.	2 $\frac{3}{4}$
Weight, Pounds	170
Rack Size	2x2 $\frac{1}{4}$

Jack No.	1523		
Capacity, Tons	15	Head, Inches	2 $\frac{3}{4}$ x4
Height, Inches	23	Foot Lift Height, Inches	2 $\frac{1}{4}$
Raise, Inches	12 $\frac{1}{2}$	Weight of Jack Only, Lbs.	70
Base, Inches	7 $\frac{1}{2}$ x10 $\frac{3}{4}$	Weight of Jack Hook, Chain, Lever, Lbs.	113
Rack Size	1 $\frac{1}{8}$ x1 $\frac{1}{8}$		

Jack No.	500
Capacity, Tons	15
Height, Inches	37 $\frac{1}{2}$ +2 $\frac{3}{4}$ Channel
Raise, Inches	23
Base, Inches	10x24
Weight, Pounds	230
Rack Size	1 $\frac{1}{4}$ x2 $\frac{1}{4}$

Jack No.	524-MCR	1030-CR	1022-CR
Capacity, Tons	5	10	10
Height, Inches Including Base	23 $\frac{3}{4}$	30	38
Raise, Inches	14	14	12
Base, Inches	8 $\frac{3}{4}$ x18	...	9 $\frac{3}{4}$ x24
Weight, Pounds	68	112	103
Rack Size	1 $\frac{1}{4}$ x1 $\frac{1}{2}$	1 $\frac{1}{8}$ x1 $\frac{1}{8}$	1 $\frac{1}{8}$ x1 $\frac{1}{8}$



## GENUINE BARRETT TRACK JACKS

**Alloy Steel Rack  
Heavier Rack Section  
Longer Life  
Lower Stress  
Maximum Safety**

117  
217  
617



These features have made genuine Barrett Duff-Norton Jacks the favorites of railroad men since 1883:

1. Tripping is quick and positive. 2. Rack is  $1\frac{5}{8}$ " square,  $\frac{1}{8}$ " larger than ordinary jacks, for greater strength in lifting and holding loads. 3. Hardened steel wearing plate eliminates housing wear. 4. New sturdy spring assures positive pawl action, prevents accidental tripping of load. 5. Both pawls are spring loaded to assure engagement of teeth with rack. 6. Short

pawl set to full length of socket lever gives greater bearing surface, greater distribution of load, reduces wear, gives longer life. 7. Closed end trunnion bushing retains lubricant. 8. Close fulcrum and correct socket angle provide high mechanical efficiency.

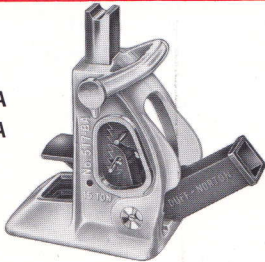
Because of *trip lowering feature* track jacks are not recommended for general industrial use. Ratchet lowering jacks are recommended for general industrial use—see page 8.

### Single acting trip • Malleable

**15 TONS**—Single acting trip lowering ratchet jacks with foot lift and thumb guard. Furnished with single square socket without lining bar. Round socket and wooden operating lever  $2\frac{7}{16}$ " x 48" can be supplied at extra cost.

**USES**—Standard with all the leading railroads for section gang work. These jacks are unexcelled for use in surfacing and lining rails. They are always safe and easy to spot.

517-B  
517-BA  
717-BA

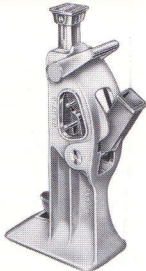


### Single acting trip • Aluminum and Malleable

**15 TONS**—Low height, single-acting, trip lowering ratchet jack with broad toe foot lift ( $2\frac{1}{2}$ " x 3"), bale handle and thumb guard. Single square socket without lining bar. Round socket and wooden lever  $2\frac{7}{16}$ " x 48" supplied at extra cost. Model 517-BA weighs 33% less than 517-B.

**USES**—For surfacing, tamping and lining track, and for installing fish plates. Special grooved head fits under ball or under rail itself, depending on height of ballast. Rigid bail type handle for easy carrying and spotting.

117-A



### Single acting trip • Aluminum

**15 TONS**—Single-acting, trip lowering jack with foot lift and thumb guard. Single square socket, without lining bar. Round socket and wooden lever supplied at extra cost. This is same jack as No. 117 except it weighs 33% less because housing is made of strong aluminum alloy.

**USES**—Use of aluminum track jacks permits workmen to move and spot jacks quickly. Crews can keep pace with fast, modern maintenance equipment.

1-A  
110

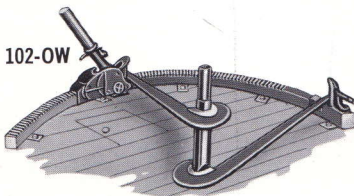


### Double acting trip and ratchet lowering

**15 TONS**—Double-acting, trip lowering ratchet jacks with foot lift. Single square socket without lining bar. Round socket and wooden bar  $2\frac{7}{16}$ " x 48" supplied at extra cost. Can be raised on both up and down strokes. Hand set levers for trip are plainly marked, for safety.

**USES**—Because of speed and high lift these jacks are recommended for extra gangs on track work. No. 110 is both trip and ratchet lowering and can be tripped instantly or lowered notch by notch. Also recommended for mines and industrial use. No. 1-A is trip lowering but not ratchet lowering.

102-OW



**OIL WELL JACKS**—Ratchet jacks designed to move on circular track, to provide force in either clockwise or counter-clockwise direction. Will handle tools up to five inches. Furnished with a wooden operating lever  $2\frac{13}{16}$ " x 54".

**USES**—For making and breaking joints of cable tool drilling bits. Wrenches are attached to top and lower parts of tool and jacking action easily breaks joint. Reverse action "makes" joints.

### Interchangeability of Parts

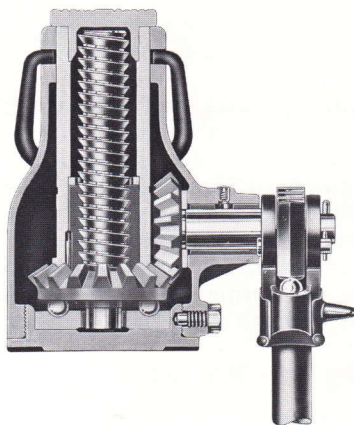
All parts for Nos. 117, 117-A, 517-B, 517-BA, 717-BA, 217 and 617 are fully interchangeable except for racks and bases. Inventory problems are simplified since only a minimum of spare parts need be stocked.

Jack No.	117	117-A	217	617	517-B	517-BA	717-BA	1-A	110
Capacity, Tons	15	15	15	15	15	15	15	15	15
Height, In.	22	22	16½	28	11½	11½	14	22	22¼
Raise, In.	13	12	7½	18½	5	5	7½	13	13
Base, In.	6½x11	6½x11	6½x11	7x12	6½x10¼	6½x10¼	6½x10¼	6½x11	6½x11
Head Dia., In.	3x3	3x3	3x3	3x3	...	...	...	3x3	3x3
Ft. Lft. Ht., In.	2	2	2	2	2	2	2	2	2
Weight Lbs.	66	46	52	81	45	31	36	60	62
Rack Size	1½x1½	1½x1½	1½x1½	1½x1½	1½x1½	1½x1½	1½x1½	1½x1½	1½x1½

Jack No.	Capacity Tools With Sqs. up to In.	Length of Rack	Radius of Rack, Inches	Travel	Wt. Complete
102-OW	5"	8'	42	5'6"	339



Made to exacting specifications from the best materials, these jacks are the finest of their type. The powerful lifting mechanism is totally enclosed, packed in grease and sealed to prevent leakage. Thread pitch on ball bearing mounted lifting screw gives maximum raise for each stroke of the lever bar. Positive safety stop prevents standard from being run out of base. Keyway prevents standard from turning under load. Easy to carry and spot.



Outstanding construction features:

- One-piece malleable iron housing.
- Cold-drawn seamless steel standard
- Drop-forged steel head • Heat treated high carbon steel screw • Manganese chrome steel heat treated gears • Phosphor bronze nut • Large molybdenum steel ball bearings • Special alloy steel ratchet assembly • Bronze bushed pinion shank and screw stem • Screw, gears and ball race machine cut to gages.

1507  
111-C-2  
2509-C-2  
2510-C-2  
3510-C-2  
5010-C-2  
100-C-12

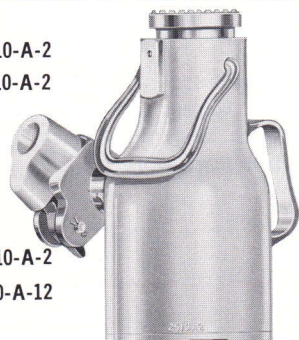


### JOURNAL JACKS • 15-25-35-50-100 Tons

All models of these ball bearing screw jacks are supplied with a 1 1/8" diameter steel combination operating lever and pinched end pry bar in lengths: 28" for 15-ton; 36" for 25 and 35-ton; 48" for 50-ton; and 60" for 100-ton. Mechanical design permits safe operation at any angle or upside down.

**USES**—For powerful lifting in low height areas such as inspecting and renewing journal brasses, bridge and structural steel erection, shipbuilding, machine shop, mill and general industrial uses.

2510-A-2  
3510-A-2



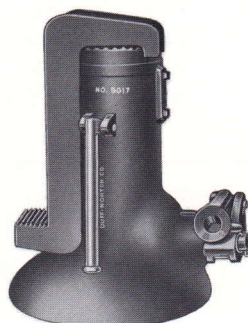
5010-A-2  
100-A-12

### ALUMINUM JOURNAL JACKS • 25-35-50-100 Tons

Ball bearing screw jacks with one-piece aluminum alloy housing. Both models furnished with a 1 1/8" diameter steel combination lever and pinched end pry bar in lengths: 36" for 25 and 35-ton; 48" for 50-ton; and 60" for 100-ton.

**USES**—Because of the aluminum alloy housing these jacks are 25% lighter than regular models. They are easier to handle and spot—save time on jobs where jacks are moved frequently. Non-rusting aluminum is ideal for outdoor exposure.

5017\*



### LOW HEIGHT HEAVY-DUTY JACKS • 50 Tons • Removable foot lift

Standard speed, ball bearing inverted screw jack with detachable clamp-on foot lift. Furnished with pinched end steel operating lever 1 1/8" x 48" long. Can be furnished at lower price without foot lift.

**USES**—For heavy-duty, high lifting in cramped, low-height areas. Ideal for bridge building, locomotive shops, shipyards and construction work. Large base gives a stable, non-tipping foundation.

**NOTE: foot lift is rated at one-half capacity of jack.**

Jack No.	1507	111-C-2	2509-C-2	2510-C-2	2510-A-2	3510-C-2	3510-A-2	5010-C-2	5017*	5010-A-2	100-A-12	100-C-12
Capacity, Tons	15	15	25	25	25	35	35	50	50	50	100	100
Height, Inches	7	10	9	10	10	10	10	10	16 1/2	10	12	12
Raise, Inches	2 1/2	5	4 1/2	5	5	5	5	4 1/2	7	4 1/2	4	4
Base Dia., Inches	4 3/4	4 3/4	5 3/8	5 3/8	5 3/8	5 3/8	5 3/8	7 1/8	12	7 3/16	8 3/4	8 3/4
Head Dia., Inches	2 5/8	2 5/8	3	3	3	3 5/8	3 5/8	4	5 1/2	4	5	5
Weight, Pounds	22	26	37	38	29	48	35	64	191	48	98	145

\*Detachable foot lift is 5" high.



S



### SMALL HEAD - Cone Bearing with foot lift

**10-15 TONS**—Standard speed, cone bearing screw jacks with foot lift. Furnished with solid steel combination operating lever and pinched end pry bar 1" x 38".

**USES**—Inexpensive, ideal for moderate loads. Small base permits spotting in cramped areas. Broad toe lift permits handling low set loads. Recommended for general industrial use.

B-2522  
B-3526

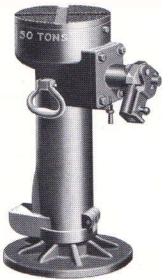


### SMALL HEAD - Foot lift

**25-35 TONS**—Standard speed, small head, ball bearing screw jacks with foot lifts. The 25-ton model comes with steel combination operating lever and pinched end pry bar 1" x 38"; the 35-ton model with lever 1 1/8" x 42" long.

**USES**—Popular for rigging, handling heavy machinery, and general industrial work. Safety signal indicates when safe limit of raise is reached.

B-5024



### LARGE HEAD - Foot lift

**50 TONS**—Standard speed, ball bearing screw jack with foot lift. Furnished with solid steel combination operating lever and pinched end pry bar 1 1/8" x 42" long. Safety signal indicates safe limit of raise.

**USES**—This large headed, heavy duty jack is geared for ease of operation. Recommended for bridge and wrecking work, rigging, construction jobs and for handling heavy jobs of all kinds.

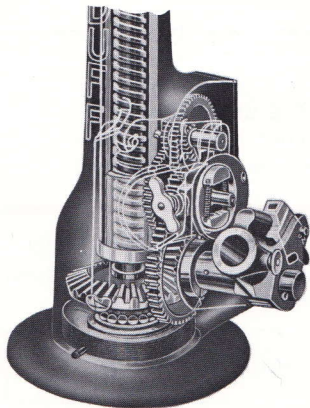
*Foot lifts on Duff-Norton Screw Jacks are rated at one-half capacity of jack.*

Jack No.	S	B-2522	B-3526	B-5024
Capacity, Tons	15	25	35	50
Height, Inches	21 7/8	22	26	24
Raise, Inches	11 1/2	10 3/4	14 3/4	10 3/2
Base, Inches	8 1/2	8x9 3/4	9x10 1/2	14 Dia.
Head Dia., Inches	4 3/8	5 3/8	6 1/2	10 3/4
Foot Lift Height, In.	2 7/8	3 1/2	3 1/2	5 1/4
Weight, Pounds	73	137	207	289

## DUFF-NORTON GOVERNOR-CONTROLLED SCREW JACKS

### GOVERNOR-CONTROLLED - Self Lowering Mechanism

*Thumb-screw controlled governor permits fingertip control of lowering speed.*



This exclusive, patented device enables loads to be lowered automatically by their own weight, without manual effort. Lowering speed is limited to 1/2" per second. Speed can be slowed or stopped instantly by simply turning thumb-screw governor. Jack cannot creep while under load. *All types and capacities of Duff-Norton governor-controlled jacks are easily adaptable for operation by air motor or electric power.*



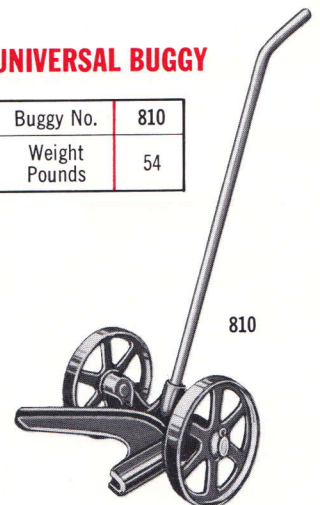
**25-35-50 TONS**—High-speed, governor-controlled, self-lowering, ball bearing screw jacks. Furnished with solid steel combination operating lever and pinched end pry bar 1 1/4" x 60" long.

**USES**—For empty or loaded freight car work, loaded trailers, moving machinery—wherever a fine mechanical jack is needed for heavy lifting.

Jack No.	2825	2835	2650	2850
Capacity, Tons	25	35	50	50
Height, Inches	28	28	26	28
Raise, Inches	15 3/4	15 3/4	13 1/2	15 1/2
Base Dia., Inches	12	12	14	14
Head Dia., Inches	4	4	5 1/2	5 1/2
Foot Lift Height, In.	...	...	...	...
Weight, Pounds	175	190	238	240

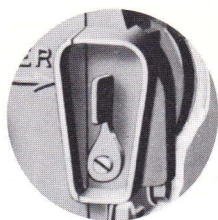
### UNIVERSAL BUGGY

Buggy No.	810
Weight Pounds	54



For easy handling of all heavy-duty screw jacks. Jack base slides easily into wedge-shaped grooves of buggy and jack is held securely in upright position.





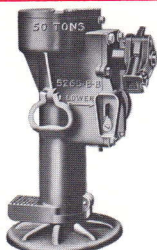
Thumb lever on side of jack gives positive control of lowering speed, with maximum safety.

### Speed controlled, self-lowering device

Eliminates the slow, laborious job of lowering loads manually. A push on the thumb lever starts, stops and controls speed of lowering. Jack can be lowered fast or slow, under perfect control. Raises smoothly, quickly with minimum manual effort. Stop

signal indicates when safe limit of raise is reached. All moving parts fully enclosed. *All types and capacities of speed-controlled, self-lowering jacks are adjustable for operation by air motor or electric power.*

3265-BB  
5265-BB  
1265-BB



### LARGE HEAD • Foot Lift

**35-50-100 TONS**—High-speed, self-lowering, ball bearing screw jacks with foot lift. Thirty-five-ton model furnished with steel combination operating lever and pinched end pry bar  $1\frac{1}{8}$ " x 50". Others supplied with lever  $1\frac{3}{16}$ " x 60".

**USES**—For installing, repairing and moving heavy equipment in plant, mills, railroad shops and shipyards. For engaging "in position" steel beams and shoring timbers. Foot lift permits use with low set loads.

5261-BB

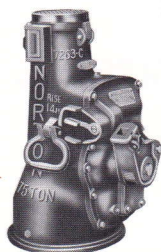


### SMALL HEAD

**50 TONS**—High speed, self-lowering, ball bearing, inverted screw jack with small head. Furnished with combination operating lever and pinched end pry bar  $1\frac{3}{16}$ " x 60" long.

**USES**—Inverted design gives maximum headroom for operating lever bar in cramped places. Small head makes it easy to spot under load. Ideal for bridge rigging, machinery handling, moving power shovels, lifting locomotives and all heavy equipment.

1263-C

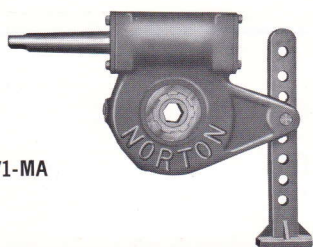


### SMALL HEAD • Heavy Duty

**100 TONS**—High-speed, self-lowering, ball bearing screw jacks with small head. Furnished with solid steel combination operating lever and pinched end pry bar  $1\frac{3}{16}$ " x 60" long. The ultimate in self-lowering heavy duty jacks.

**USES**—In great demand for lifting locomotives and cars, bridge and construction work and all jobs where constant use demands easy spotting, fast load engagement, high-speed lifting and trouble-free service.

571-MA



### MOTOR ATTACHMENT • Norton Type

Converts all speed controlled, self-lowering jacks to motor operation with either rotary air or electric drill motors ( $1\frac{1}{2}$  to 2" drill size). Reduces jacking time 90%. To install ratchet case assembly, slip motor attachment on shaft—quickly slipped off

when lowering. No bolts or other fasteners needed. Adjustable torque foot rests on ground when used with jacks having ratchet case at bottom of jack. For jacks with ratchet case that raises with load, torque foot is placed against load.

*Foot lift on Duff-Norton Screw Jacks are rated at one-half capacity of jacks.*

Jack No.	3265-BB	5265-BB	1265-BB	5261-BB	1263-C
Capacity, Tons	35'	50	100	50	100
Height, Inches	26	26	26	26	26
Raise, Inches	14	14½	12	14½	13½
Base Dia., Inches	12	14	13¾	13¾	13¾
Head Dia., Inches	6¾	10	10	6	7½
Foot Lift Height, In.	3¾	4¾	4½	...	...
Weight, Pounds	178	292	412	269	402

*Input Shaft—#4 Morse Taper (#3 optional). Note: when ordering motor attachment, specify jack number with which attachment is to be used.*

### 571-MA AIR MOTOR ATTACHMENT

The following table shows adapters & adapter bushings to be used for various Jacks.

Jack Numbers	Size of Adapter Hex.	Adapter No.	Adapter Bushing No.
S	.881	N-562	N-556
B-2522	1.024	N-563	N-556
B-3526, B-5024, 3265-BB	1.172	N-564	N-557
5261-BB, 5265-BB, 1263-C, 1265-BB	1.339	N-565	N-558
*2650, 2825, 2835, 2850	1.500	N-567	N-559

\*For Duff High Speed & Governor-Controlled Jacks, which are self-lowering, remove air motor attachment when lowering the jack.



1½ x 8  
1½ x 10  
1½ x 12  
1¾ x 10



2 x 8  
2 x 10  
2 x 12

### BELL BOTTOM SCREW

**12-16-20 TONS**—Extra-heavy, one-piece fully enclosed base. Heavy duty ball bearings reduce friction—making this the easiest operating jack on the market. Base

is sealed to keep dirt out of mechanism.

For all-purpose lifting and holding on construction jobs, rigging, moving buildings and in plants.

825-L

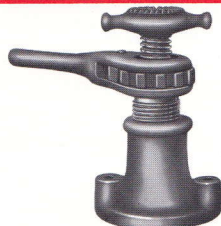


### LOCOMOTIVE SCREW

**25 TONS**—One-piece, extra heavy, fully-enclosed base. Heavy duty molybdenum steel balls make it easy to handle capacity loads with little effort. Lifting screw is high manganese steel. Base sealed to keep out dirt and corrosion.

**USES**—Built to take severe punishment at full capacity without failure. For powerful lifting in locomotive repair shops and all general purpose work.

T-11  
T-14



### TELESCOPE

**10-20 TONS**—Screw jack with ratchet lever socket. Telescope head can be spun out quickly to meet load. Ratchet lever socket speeds up work, permits safe, easy use in close quarters.

**USES**—Used principally where low height and high raise are important in cramped places. Recommended for bridge work, concrete forms, car repairing and general construction work.

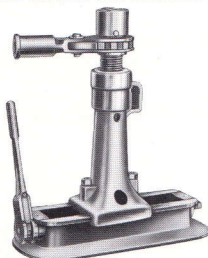
Jack No.	1½x8*	1½x10*	1½x12*	1¾x10*	2x8*	2x10*	2x12*
Capacity, Tons	12	12	12	16	20	20	20
Screw Dia., Inches	1½	1½	1½	1¾	2	2	2
Closed Height, In.	10¾	12¾	14¾	13½	11¾	13¾	15¾
Extended Height, In.	15¾	19¾	23¾	21	16¾	20¾	24¾
Raise, Inches	6	7	9	7	5	7	9
Base Dia., Inches	6	6½	6½	6¾	6½	6¾	7¾
Head Dia., Inches	3½	3½	3½	3½	3½	3½	3½
Weight, Pounds	13	15	18	21½	21½	25	32

\*Jack No. indicates both screw size and height of base in inches.

Jack No.	825-L
Capacity, Tons	25
Screw Dia., Inches	2
Height, Inches	12½
Raise, Inches	4½
Base Dia., Inches	6¾
Head Dia., Inches	3½
Weight, Pounds	28

Jack No.	T-11	T-14
Capacity, Tons	10	20
Height, Inches	8¾	16
Raise, Inches	7	18
Base Dia., Inches	7½	8¾
Head Dia., Inches	3½	3½
Weight, Pounds	37	75

S-825

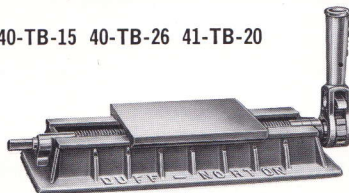


### TRAVERSING SCREW

**35 TONS**—Screw jack with ratchet lever socket mounted on ratchet lever operated screw traversing base. Furnished with steel operating lever 1½" x 54" long, which is also used as carrying handle. Ratchet lever handle can be applied to either end of base screw shaft.

**USES**—Used in pairs for lifting and rerailling light locomotives and cars, mining, rigging and many jobs where moving as well as lifting load is required.

40-TB-15 40-TB-26 41-TB-20

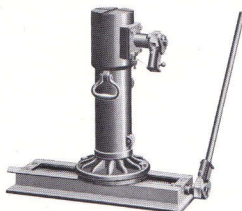


### TRAVERSING BASES

**50-100 TONS**—Screw propelled, two-way traversing bases. No. 40-TB-15 and 40-TB-26 furnished with wooden operating lever 1½" x 24". No. 41-TB-20 furnished with steel lever 1" x 24" long.

**USES**—For moving any type of jack horizontally while under load. Perfect for rerailling locomotives and cars, resetting heavy machinery. Ratchet socket applies to either end of shaft.

524



### TRAVERSING BASE JACK

**50 TON**—Ball bearing screw jack mounted on traversing base. Jack used with this base is described on page 11. See table below, right, for base specifications.

**USES**—For tool and wrecking car outfits and for all combination lifting and lateral moving of loads.

Jack No.	S-825
Capacity, Tons	35
Height, Inches	24
Raise, Inches	10½
Horizontal Travel, In.	12¾
Base, Inches	9¼x22¾
Head Dia., Inches	4½
Weight, Pounds	139

Base No.	40-TB-15	40-TB-26	41-TB-20
Capacity, Tons	50	50	100
Height, Inches	4¾	4¾	4
Horizontal Travel, In.	15	26	20
Weight, Pounds	110	134	146
Size of Plate, In.	10x12	10x12	14 Dia.

Jack No.	524
Capacity, Tons	50
Style of Jack	B-5024
Style of Base	41-TB
Height, Inches	28
Raise, Inches	10½
Weight, Pounds	435



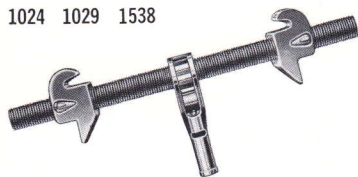


### REEL JACKS "A" Frame Base

**5 TONS**—Screw jack with "A" frame base and three-way nut. Frame is made of L-shape steel angles. Lateral spread of legs is 38½", for firm support. No. 520-CR holds reels 42" to 60" diameter; No. 530-CR holds 60" to 90" reels. Lifting hook takes spindles up to 2½" diameter.

**USES**—For lifting and holding reels of cable, wire rope and belting in shops and warehouses. Operates fast and easily. See 5 and 10-ton ratchet reel jacks on page 8.

1024 1029 1538



### PUSH AND PULL JACKS

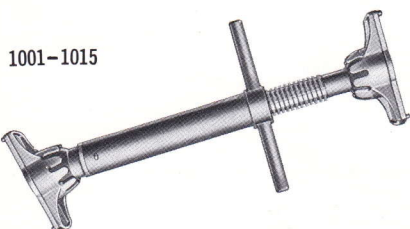
**10-15 TONS**—Screw jacks with ratchet lever sockets. Furnished with wooden operating lever 17½" x 24", except 1538 square socket without lining bar. Equipped with spring actuated pawls, for safety.

**USES**—For erecting bridges, docks, tanks and piling, and for pulling together or pushing apart steel plates and beams. Also valuable for straightening sides of freight cars and truck bodies.

Jack No.	520-CR	530-CR
Capacity, Tons	5	5
Height, Inches	20	30
Raise, Inches	11½	16½
Base, Inches	12½ x 26½	15¼ x 39½
Weight, Pounds	66	90

Jack No.	1024	1029	1538
Capacity, Tons	10	10	15
Screw Dia., Inches	2	2	2½
Pushing Closed, In.	7¾	7¾	7½
Pushing Extended, In.	21½	25½	34
Pulling Closed, In.	5¾	5¾	7½
Pulling Extended, In.	19½	23½	34
Weight, Pounds	46	50	97
Overall Screw Length, In.	24	28	38

*Duff-Norton Push and Pull Jacks can be furnished in greater lengths than listed.*

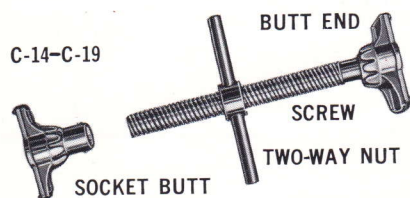


### STEEL TRENCH BRACES—Complete

For safe, economical bracing on all trench and excavating jobs. Ball and socket joint at each end of brace permits rapid adjustment to any angle. Lugs on each shoe face grip planking firmly. Two-way lever nut with blunt ends is standard. Adaptable to any

width trench by using different lengths of standard pipe.

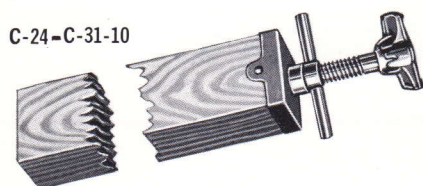
*Three-way lever nut permits working in close quarters where regular two-way nut cannot be used. Holes in nut take 1" round operating lever.*



### TRENCH BRACE FITTING for make-it-yourself use

Buy only the butt ends, screws, nuts and socket butts. Then cut your own pipe to desired lengths and assemble

your own trench braces. See table below for specifications. Screw ends and socket butts can be furnished separately.



### STEEL TIMBER BRACE FITTINGS

For making wooden timbers adjustable to various widths for bracing concrete forms, subways, excavations and inside trenches. Screw ends are the same as

those in the steel trench braces. Timber caps can be furnished separately. Caps, 12" x 12", are available on special order.

Steel trench bracer complete with pipe

Brace No.	1001	1002	1003	1004	1005	1006	1007	1008	1009	1011	1012	1013	1014	1015
Pipe Size	1½	1½	1½	1½	1½	1½	1½	1½	1½	2	2	2	2	2
Screw Dia.	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½
Length of Brace Closed, Inches	16	18	21	24	27	30	36	42	48	36	42	48	54	60
Length of Screw, Inches	10	12	14	14	16	16	18	18	18	18	18	18	18	18
Safe Extension of Screw, In.	6	7	8	8	9	9	10	10	10	10	10	10	10	10
Weight, Pounds	14	15	16	16	17	18	20	21	23	39	40	43	44	45

Screw length is measured from center of ball to end of screw. The thread is 2" shorter.

Steel trench brace fittings without pipe

Brace Fitting No.	C-14 C-32*	C-15 C-33*	C-16 C-34*	C-17 C-35*	C-18 C-36*	C-19 C-37*	Timber Brace No.	C-24 X-671†	C-25 X-672†	C-29 X-672†	C-30 X-688†	C-31 X-689†	C-31-10 X-691†
Screw Dia., Inches	1½	1½	1½	1½	1½	1½	Screw Dia., Inches	1½	1½	1½	1½	1½	1½
Screw Length, In.	10	12	14	16	18	18	Screw Length, In.	14	14	18	18	18	18
Safe Extension of Screw, In.	6	7	8	9	10	10	Timber Cap, Inches	4x4	6x6	6x6	6x6	8x8	10x10
Weight, Lbs.	11	12	13	14	14	31	Weight, Lbs.	12	14	15	28	31	33

\*Without socket butt

†Timber caps only



## MINE TIMBERING AND ROOF JACKS

**COMPLETE JACKS:** Duff-Norton supplies complete jacks to your specifications for heads, handles, bases and lengths. Structural members are square, cold-drawn seamless tubing with solid, welded base. Completely silver-gray enameled for high visibility.

**FITTINGS ONLY:** For customers who prefer to make their own jacks, Duff-

Norton supplies heads, screw handles and bases. Customer supplies 2" standard or extra strength pipe, depending on whether 8 or 16-ton capacity is desired. Fittings can be switched to various lengths of pipe as desired.

### Quick Facts About Jack Fittings

- Screws are steel drop forgings, heat treated and accurately machined.

- One man can lift timbers or beams with ease.
- Five types of heads available for safety seating H-Beams, rails, round or square timbers, or for direct application against mine roof.
- Three types of handles and three types of bases available.
- All fittings are available in any combination.

### Fittings Heads



**TYPE "H"**—used with 4" H-Beams or rails.



**TYPE "B"**—ball and socket with non-slip lugs for flat timbers, beams or direct contact to roof.



**TYPE "I"**—available in 6½", 8¼" and 11¼" sizes for H-Beams, round or square timbers.

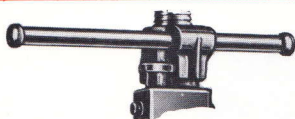


**TYPE "L"**—for supporting ends of timbers, beams or rails at desired angle.



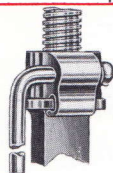
**TYPE "V"**—for various diameter round timbers.

### Handles



**SLIDE HANDLE**—for extra leverage in close quarters.

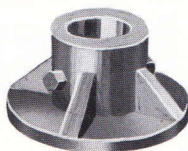
**DROP HANDLE**—similar to the slide handle except it folds down when not in use.



**WING NUT HANDLE**—for open areas where a firm, two-handed grip is possible.

### Bases

**ROUND BASE**—cored pocket to fit on standard or extra strong pipe, with ⅜" diameter hole to fasten fitting to pipe. Use with ⅜" diameter bolt.

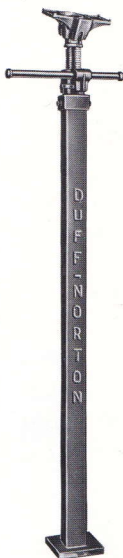


**"VEE TYPE" ROUND BASE**—(round fishtail) cored pocket to fit standard or extra strong pipe, with ⅜" diameter hole to fasten fitting to pipe. Use with ⅜" diameter bolt. The end is grooved to fit over 1½" diameter pin.

## COMPLETE JACKS

**8-16 TONS**—Screw jacks complete with square seamless cold-drawn tubing body. Solid, square base. Choice of heads and handles.

**USES**—For cross timbering, mine roof support and protection of working areas. Will serve as safe support under most difficult roof conditions until permanent timbering is installed. Also used as temporary props when setting loading and conveyor machinery and roof bolting.



## FITTINGS ONLY

**8-16 TONS**—Screw jack heads, handles and bases (see below) for assembling your own timbering and roof jacks.

### ANGLE JACK

**8-16 TONS**—Screw jack with "L" head, choice of handles and fishtail bases with or without tubing, for assembling your own jacks.

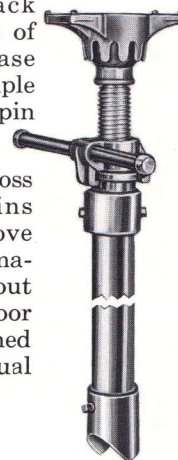
**USES**—When used as an angle jack the fishtail base can be placed directly on floor. (These jacks can also be furnished complete to your specifications.)



## PIN TIMBERING JACKS

**8-16 TONS**—Screw jack with "B" heads, choice of handles and fishtail base *without tubing*, for simple assembly of your own pin timbering.

**USES**—For supporting cross timbers from steel pins driven into rib holes above floor level to permit machinery to operate without danger of knocking out floor posts. (Can also be furnished complete to your individual specifications.)



For pin timbering or angle jacks with square tubing, specify MR-8-P or MR-16-P. For round tubing, specify MR-80-P or MR-160-P.

MR-8 or MR-8-P (Capacity 8 tons)

MR-16 or MR-16-P (Capacity 16 tons)

Minimum Height Closed	Maximum Height Open	MR-8 Weight Pounds	MR-16 Weight Pounds
30"	45"	31	45
36"	51"	33	48
42"	57"	34	51
48"	63"	36	54

Minimum Height Closed	Maximum Height Open	MR-8 Weight Pounds	MR-16 Weight Pounds
54"	69"	38	56
60"	75"	40	59
66"	81"	42	62
72"	87"	43	65

PIPE NOT FURNISHED

Jack No.	Capacity Tons	Screw Dia. Inches	Screw Raise Inches	Pipe Column to be used
MR-80 or MR-80-P	8	1⅞	15	2" Standard
MR-160 or MR-160-P	16	1⅞	15	2" Extra Strength

Heights given are for type "B" heads. For other heads deduct 2" on MR-8 models, 1½" on MR-16 models. MR-8 screws are 1½" diameter. MR-16 screws 1⅞" diameter.



**Forged steel top** fitted into high carbon seamless steel tubing standard.

**Easy to move** and spot with long trundling handle and collapsible spotting handles.

**Up or down hand throttle control** well guarded. Position of lever clearly indicates direction up or down.

**Sturdy malleable iron shell** with large diameter base assures stability under top-heavy loads.

**Goes anywhere**—10" diameter, 2½" face, solid rubber-tire, roller bearing wheels assure easy portability over rough surfaces or soft ground. Pneumatic tire wheels also available.

**Trundling handle folds down** and out of the way when jack is in use. Ribbed handle assures firm grip.

## AIR MOTOR SCREW JACKS

*All Duff-Norton Air Motor Power Screw Jacks can lift rated capacity with only 85 lbs. air pressure.*

## SAFETY FEATURES

Duff-Norton Rotary Air Motor Screw Jacks are absolutely safe and dependable—they are made of the finest grade of metals, accurately machined with close tolerances, carefully fitted and thoroughly tested before shipment.

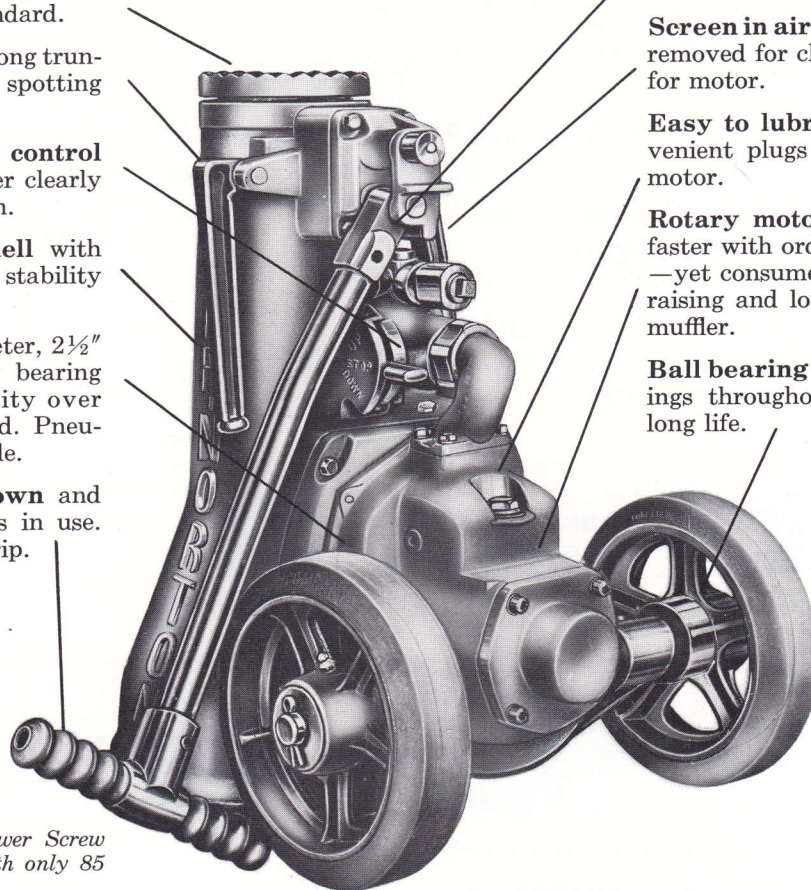
A **BRAKE** is provided on the air motor to prevent accidental lowering.

**THE LOAD** is lowered entirely, as well as raised, by air motor; so that the lowering speed is always under constant control—never any slipping or any sudden dropping of the load resulting in injuries to men and to equipment.

**THE DESIGN** of the jack prevents lowering or creeping under load in case of air failure due to disconnection or injury to the hose—completely insuring safety of men working on the job.

**KEY WAY** in ram prevents head from turning and shifting load.

**STABILITY** is engineered into every construction feature of Duff-Norton Power Jacks. The broad, sturdy base prevents tipping or settling. Roller bearing, rubber-tire wheels insure easy portability. Powerful built-in air motor makes for compactness and simplicity.



**The automatic shut-off** cuts out the motor when the lifting standard reaches the safe limit of its raised or lowered position.

**Screen in air hose connection**, easily removed for cleaning, assures clean air for motor.

**Easy to lubricate** through two convenient plugs in jack and one in air motor.

**Rotary motor** operates 25 per cent faster with ordinary shop air pressures—yet consumes less air. Used for both raising and lowering. Built-in exhaust muffler.

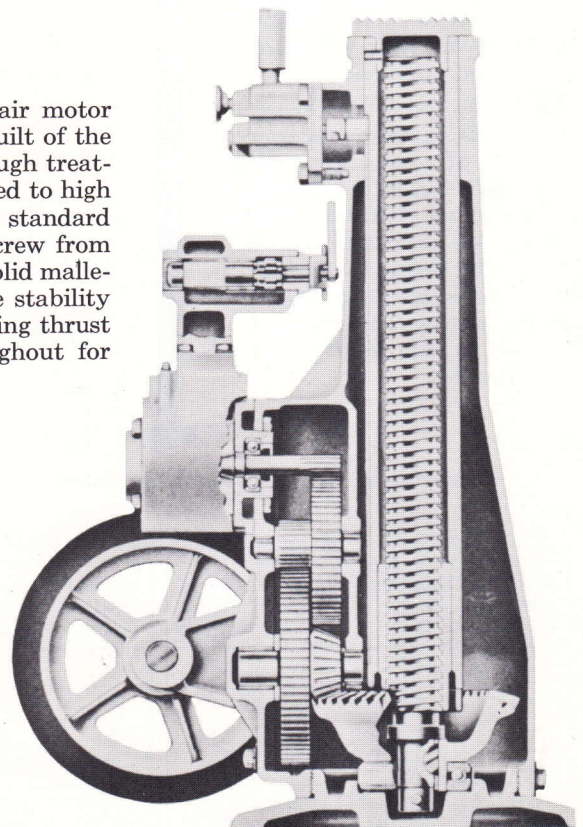
**Ball bearing thrust** and radial mountings throughout for easy action and long life.

*Air line Filter Lubrication is recommended for these Jacks*

## A QUALITY TOOL IN EVERY WAY!

Every working part of the air motor screw jack is designed and built of the best quality steels to take rough treatment. Forged steel top is fitted to high carbon seamless steel tubing standard which covers and protects screw from dirt. The housing or shell is solid malleable iron, weighted to assure stability under heavy loads. Ball bearing thrust and radial mountings throughout for easy action and long life.

228-R





## AIR MOTOR POWER SCREW JACKS

Air Motor screw jacks, engineered by Duff-Norton, represent the most modern development in heavy-duty lifting and lowering jacks. These precision built, sturdy, dependable machines employ the time-tested basic screw principle with fool-proof, built-in rotary air motor. As an example of the speed

and economy of these mechanized jacks, one man, operating two jacks simultaneously\*, can raise or lower in a few minutes the heaviest loaded freight car, diesel locomotive or truck trailer with a flick of his finger. The same job with hand operated jacks would require four men a total of 35 to 40 minutes. Made

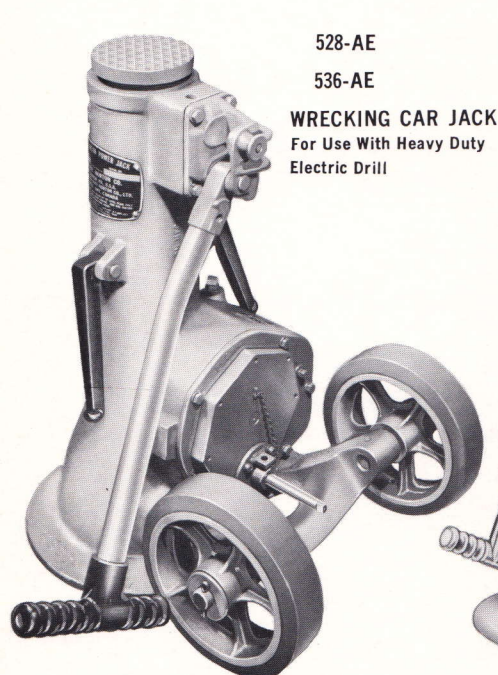
in six models in capacities from 20 to 100 tons. Note the outstanding features that have made these rugged tools so popular with both workmen and supervisors wherever continuous lifting and lowering is a daily job.

## 20-100 TONS Screw jacks operated by rotary motors

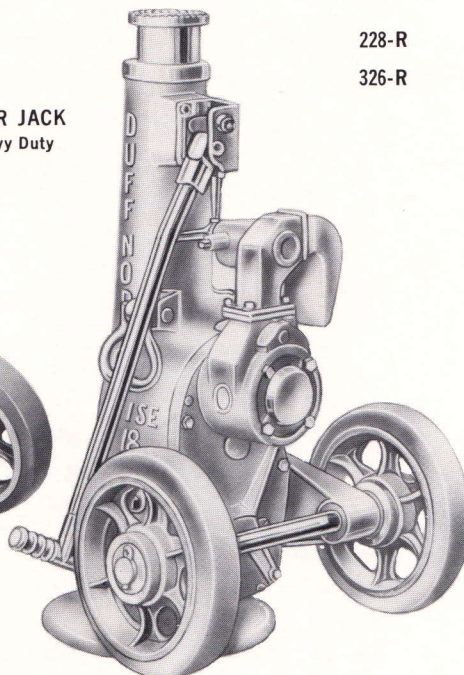
\*"Y" connection for operating two jacks simultaneously consists of 20-ft. sections of  $\frac{3}{4}$ " hose with necessary ends, snap couplings, clamps and "Y" valves. Available at extra cost.

## USES

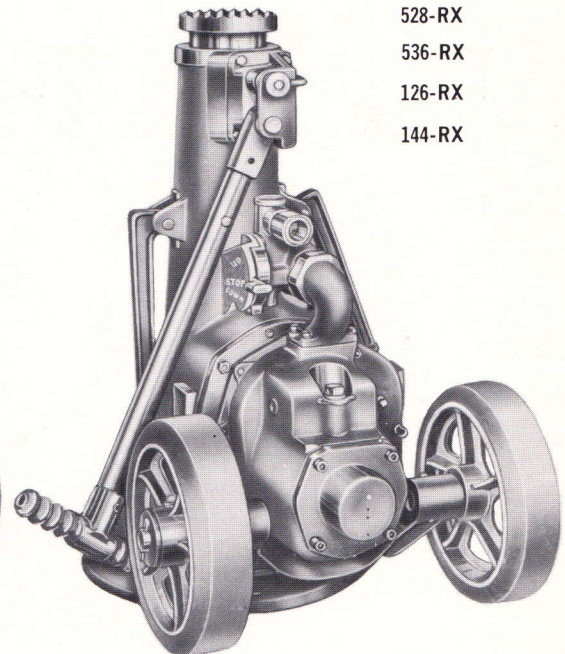
- Jacking the heaviest railway locomotives and cars.
- Jacking the heaviest, loaded truck trailers.
- Rigging, handling heavy machinery and equipment.
- Pushing culvert pipe through solid earth or fill.
- Rerailing locomotives and cars (when used in pairs with traversing bases).
- Bridge moving.
- Sinking piling.
- Bridge repairs.
- Pressing bushings.
- Straightening sides, ends, sills of freight cars—straightening tanks, heavy bins, dump truck bodies, ship repairs.
- Industrial forming work.
- Use for compression loads only.



528-AE  
536-AE  
**WRECKING CAR JACK**  
For Use With Heavy Duty  
Electric Drill



228-R  
326-R



528-RX  
536-RX  
126-RX  
144-RX

Jack No.	528-AE	536-AE	228-R	*326-R	528-RX	536-RX	126-RX	144-RX
Capacity, Tons	50	50	20	35	50	50	100	100
Height, Inches	28	36	28	26	28	36	26	44
Raise, Inches	17	25	18	14 $\frac{3}{4}$	17	25	13 $\frac{3}{4}$	30
Base Dia., Inches	14	15	12	14	14	15	13	18
Head Dia., Inches	5	5	4	4	5	5	6 $\frac{1}{8}$	6 $\frac{1}{8}$
Weight, Pounds	335	335	238	258	370	425	448	530

\*This jack designed specially for empty tank car repair work.

## DUFF-NORTON AUTHORIZED REPAIR STATIONS

There are more than sixty-five authorized Duff-Norton Repair Stations strategically located throughout the United States. All of them have the experience and facilities to

provide fast, efficient repair service. Call your Duff-Norton distributor or write direct to Duff-Norton Company for the names and addresses of the repair stations nearest you.



**The Duff-Norton Company firmly believes  
that the most efficient purchasing system is through  
**RECOGNIZED INDUSTRIAL DISTRIBUTORS****

No one has yet been able to devise a more efficient, lower cost method of buying industrial goods and services than the system established by *recognized* industrial distributors throughout the United States.

Recognized distributors provide immediate availability of tools and supplies, emergency service around the clock, one source for many items and assurance of dependable products. There is no need to tie-up space, cash, inventory or people of your

own in stockrooms. There is a minimum of paper work.

Every time you by-pass a recognized distributor in the purchase of industrial supplies and equipment, you are in effect weakening the most efficient purchasing system ever invented.

Think it over next time you're tempted to buy industrial supplies or equipment at what looks like a lower price from someone other than a recognized industrial distributor.



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